

MULTI-FUNCTION VACUUM CLEANER ACCESSORY

The present invention relates to a vacuum cleaner and, more specifically, to a multiple-function cleaning accessory for a vacuum cleaner.

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BACKGROUND OF THE INVENTION

With the advent of the wet/dry vacuum, consumers are able to clean a multitude of areas of their home or business, and multiple types of both wet and dry debris by using only one device. This technology thus allowed consumers to clean both wet and dry areas, without having to purchase separate machines.

The requirements for cleaning elements used in cleaning hard surfaces, such as linoleum tile or hard wood floors, differ significantly from the requirements for cleaning elements used on soft surfaces, such as carpet or upholstery. Similarly, different cleaning elements are needed for dry suction cleaning operations than for wet cleaning operations. Thus, wet/dry vacuum cleaners employ various types of nozzle-mounted cleaning elements for cleaning various types of working surfaces.

Several methods have been developed to enable changeover between different cleaning elements for use on different types of working surfaces. One method of enabling changing of the cleaning elements involves mounting the cleaning elements on a rotatable nozzle as shown, for example, in U.S. Patent No. 2,867,835, U.S. Patent No. 4,864,681 and U.S. Patent No. 5,060,342. The nozzle may then be rotatably indexed until the desired cleaning element is oriented to engage the working surface. A drawback of these rotatable indexing mechanisms is that they are relatively bulky, expensive and complicated.

Other vacuum cleaner nozzles have been configured for the mounting of different types of cleaning elements thereto, as shown in U.S. Patent No. 6,279,198. However, the different

cleaning elements are frequently incorporated into separate parts, thereby increasing the number of components that must be produced and stored for use. Also, a separate piece, or “adapter”, may be required to enable mounting of one or more of the cleaning elements to the nozzle.

In view of the above, there is a need for a simple multi-function vacuum cleaner accessory which is easily adaptable for cleaning a variety of working surfaces such as bare floors or carpets, and also for picking up liquids from a working surface.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings illustrating embodiments of the present invention:

FIG. 1 is a bottom perspective view of the vacuum cleaner accessory of the present invention;

FIG. 2 is an exploded bottom perspective view of the vacuum cleaner accessory of FIG. 1, showing the cleaning element detached from the nozzle;

FIG. 3 is a cross-section view of the vacuum cleaner accessory along line 3-3 of FIG. 1 showing the cleaning element removably secured to the nozzle;

FIG. 4 is an enlarged view of a portion of FIG. 3 showing the cleaning element removably secured to the nozzle and oriented such that the brush member is engageable with a working surface;

FIG. 5 is an enlarged view of a portion of FIG. 3 showing the cleaning element removably secured to the nozzle and oriented such that the squeegee member is engageable with a working surface;

FIG. 6 is a rear view of the vacuum cleaner accessory of FIG. 1 without the cleaning element;

FIG. 7 is a bottom plan view of the vacuum cleaner accessory of FIG. 1; and

FIG. 8 is a bottom plan view of the cleaning element which is shown detached from the nozzle in FIG. 2.

DETAILED DESCRIPTION OF THE INVENTION

Before proceeding, it should be understood that such terms as "left", "right", "top", "bottom", etc., have been used herein and in the claims to facilitate a concise description and to better understand the invention. Such terms are not intended in any way to be limiting, because the vacuum cleaner accessory described below may be oriented as required to operate on working surface having a variety of orientations.

Referring to FIGS. 1-3, multiple-function vacuum cleaner accessory 20 comprises a nozzle 22 and a cleaning element 100. Nozzle 22 is configured for movement along a working surface (not shown), for example a bare floor or a carpeted floor, for cleaning the surface when in contact with the working surface. Nozzle 22 is generally rectangular and includes a front outer wall 24, a rear outer wall 26 and a pair of opposed side outer walls 28 joined at their respective ends and terminating in a bottom edge 30 to define an opening 32 leading into a suction chamber 34 at a first end 36 of the nozzle 22. Nozzle 22 tapers down from opening 32 at first end 36 toward a second end 38 of the nozzle 22 having a reduced cross-sectional area and terminating in an orifice 40 configured for attachment to a vacuum cleaner assembly. An elbow member 42 may be attached to a second end 38 of the nozzle 22 to enable connection of the nozzle 22 to the vacuum cleaner assembly. Alternatively, nozzle second end 38 may be directly connected to a wand or other portion of the vacuum cleaner assembly.

A series of wall portions 44 are formed in a lower portion of opening 32 along front outer wall 24 to define a series of airflow passages 46 (see FIG. 7) extending between the exterior of the nozzle 22 and suction chamber 34. Lower surfaces 48 of wall portions 44 form portions of

bottom edge 30. A plurality of positioning ribs 60 project from an interior surface of the front outer wall 24 into suction chamber 34. One or more surfaces of cleaning element 100 abut ribs 60 when the cleaning element 100 is removably secured to nozzle 22.

Referring to FIG. 6, rear outer wall 26 includes a pair of slots 54 into which a pair of cantilevered detent members 52 extend for complementary engagement with latch members 102 (see FIG. 8) formed on cleaning element 100 to removably secure cleaning element 100 to nozzle 22. As seen in FIGS. 4 and 5, free ends 56 of cantilevered detent members 52 have rounded portions (see FIG. 4) for abutting a web portion 58 of latch member 102 to help secure cleaning element 100 to nozzle 22. Free ends 56 of detent members 52 may be recessed from nozzle bottom edge 30 to engage complementary latch members 102 on cleaning element 100 when the cleaning element 100 is inserted through nozzle opening 32 into suction chamber 34. Each detent member 52 is designed so as to provide a slight clearance between latch web portion 58 and the rounded portion of detent member free end 56 when latch arms 116 of latch members 102 abut positioning shoulders 50.

Referring to FIG. 6, a positioning shoulder 50 is formed proximate a base end 62 of each of detent members 52 against which a portion of a corresponding latch member 102 abuts when the cleaning element is removably secured to nozzle 22. Positioning ribs 60 and positioning shoulders 50 of nozzle 22 are formed spaced apart from bottom edge 30 so as to enable cleaning element 100 to be recessed with respect to bottom edge 30 when the cleaning element is removably secured to nozzle 22.

Referring to FIGS. 2, 4 and 8, cleaning element 100 includes a brush member 106 and a squeegee member 108 affixed to a mounting member 110. Mounting member 110 is configured to permit airflow from outside nozzle 22 into and through suction chamber 34 when removably

secured to nozzle 22. Mounting member 110 has a pair of grooves 112 and 114 formed therein for receiving and securing therein brush member 106 and squeegee member 108, respectively.

A plurality of latch members 102 extend from mounting member 110 for complementary engagement with detent members 52 on nozzle 22. Latch members 102 include a pair of substantially parallel arm portions 116 projecting from mounting member 110, each arm portion having a base end 118 and a free end 120, and a web portion 122 connecting the free ends 120 of arms 116. Web portions 122 of latch members 102 engage free ends 56 of detent members 52 during attachment of cleaning element 100 to nozzle 22. Portions of latch member arms 116 also define a plurality of first bearing surfaces abutting some of positioning ribs 60 and positioning shoulders 50, respectively, when the cleaning element 100 is removably secured to nozzle 22. A plurality of cantilevered bearing members 134 also extend from mounting member 110 for abutting others of positioning ribs 60 on nozzle 22 when cleaning member 100 is removably secured to the nozzle 22.

FIG. 5 shows brush member 106 which is comprised of a brush head 126 and a plurality of bristles 128. Brush head 126 of brush member 106 is typically secured within brush groove 112 using an interference fit. Bristles 128 of brush member 106 project from an open side of groove 112. Alternative types of brushes, such as fabric brushes, may also be used provided they are capable of being formed on or affixed to mounting member 110. Squeegee member 108 includes a working edge 130 and a mounting head 132. Mounting head 132 is typically secured within squeegee groove 114 using an interference fit. Working edge 130 of squeegee member 108 projects from an open side of squeegee groove 114 in a direction generally parallel but opposite to the direction in which bristles 128 project from mounting member 110.

Removable attachment of cleaning element 100 to nozzle 22 will now be discussed.

Whether cleaning member 100 is attached to nozzle 22, and the orientation of the cleaning member 100 if attached to the nozzle 22, generally depend on the type of cleaning surface to be cleaned. For instance, to remove dust or particulate matter from a smooth, dry, non-carpeted surface, it may be desirable to detach cleaning member 100 from nozzle 22 and to engage the working surface with the nozzle 22 alone. When a carpeted working surface is to be cleaned, cleaning element 100 may be removably secured to nozzle 22 such that bristles 128 of brush member 106 engage the working surface during use. When water or other liquids are to be removed from the working surface, cleaning element 100 may be secured to nozzle 22 such that squeegee working edge 130 engages the working surface during use. Thus, it may be seen that the design of nozzle 22 and cleaning element 100 enable accessory 20 to be easily re-configured to clean a wide variety of working surfaces.

Referring to FIG. 2, to removably secure cleaning element 100 to nozzle 22 such that bristles 128 of brush member 106 will engage the working surface during use, the cleaning element 100 is positioned inside nozzle 22 proximate bottom edge 30 and oriented with respect to nozzle 22 such that bristles 128 project from brush groove 112 toward and out of opening 32, latch members 102 are aligned with corresponding detent members 52 extending from nozzle rear outer wall 26, and bearing members 134 are aligned with corresponding ones of positioning ribs 60.

Cleaning element 100 is then moved toward nozzle opening 32 and into suction chamber 34, whereby rounded free end portions 56 of detent members 52 are engaged by web portions 58 of latch members 52. Engagement between web portions 58 and rounded free end portions 56 cause free ends 56 of detent members 52 to resiliently deflect in the direction represented by

arrow "A" as shown in FIG. 4, allowing web portions 58 to slide to over rounded free end portions 56. As movement of cleaning element 100 continues in the same direction and web portions 58 slide past rounded end portions 56 of detent members 52, detent members 52 snap back to a substantially undeflected state. Bearing members 134 now rest on positioning ribs 60, bearing surfaces 122 rest on positioning shoulders 50, and web portions 122 are secured between rounded free end portions 56 and positioning shoulders 50, thereby removably securing cleaning element 100 to nozzle 22. Rounded free ends 56 of detent members 52 help prevent latch member webs 122 from sliding with respect to, and disengaging from, detent members 52 without application of a pulling force by a user. Also, due to the location of positioning shoulders 50 and positioning ribs 60, and due to the configuration of the cleaning member 100, cleaning member 100 resides within suction chamber 34 and is spaced apart from bottom edge 30 such that either the brush member 106 or the squeegee member 108 extends toward and out of nozzle opening 32 from a position spaced apart from the nozzle opening 32.

It will be understood that cleaning member 100 may be removably secured to nozzle 22 using any one of numerous equivalent alternatives to the latching system described above. For example, ends of the cleaning member 100 may be press fit into complementary grooves formed along interior portions of side outer walls 28.

Referring to FIGS. 2, 4 and 5, to change the orientation of cleaning element 100 from that of FIG. 4 to that shown in FIG. 5 such that squeegee working edge 130 will engage the working surface during use of the accessory 20, force is applied on cleaning element 100 by a user to direct the cleaning element toward nozzle opening 32, causing web portions 122 of latch members 102 to engage the rounded free end portions of respective detent members 52. Further application of force in this direction causes detent members to deflect in the directions

represented by arrow "A" in FIG. 4, allowing web portions 122 to slide over rounded free end portions 56 and allowing cleaning element 100 to detach from nozzle 22. The cleaning element is then rotated 180 degrees about an axis "B" extending perpendicular to a longitudinal axis of cleaning element 100, as shown in FIG. 2. This rotation of cleaning element 100 results in the cleaning element being oriented with respect to nozzle 22 such that squeegee working edge 130 projects from squeegee groove 114 toward and out of opening 32, latch members 102 are once again aligned with corresponding detent members 52 extending from nozzle rear outer wall 26, and bearing members 134 are once again aligned with corresponding positioning ribs 60. Cleaning element 100 is then moved into suction chamber 34 such that latch members 102 engage detent members 52 as described above.

It should be understood that the preceding is merely a detailed description of one embodiment of this invention and that numerous changes to the disclosed embodiment can be made in accordance with the disclosure herein without departing from the spirit or scope of the invention. The preceding description, therefore, is not meant to limit the scope of the invention. Rather, the scope of the invention is to be determined only by the appended claims and their equivalents.